



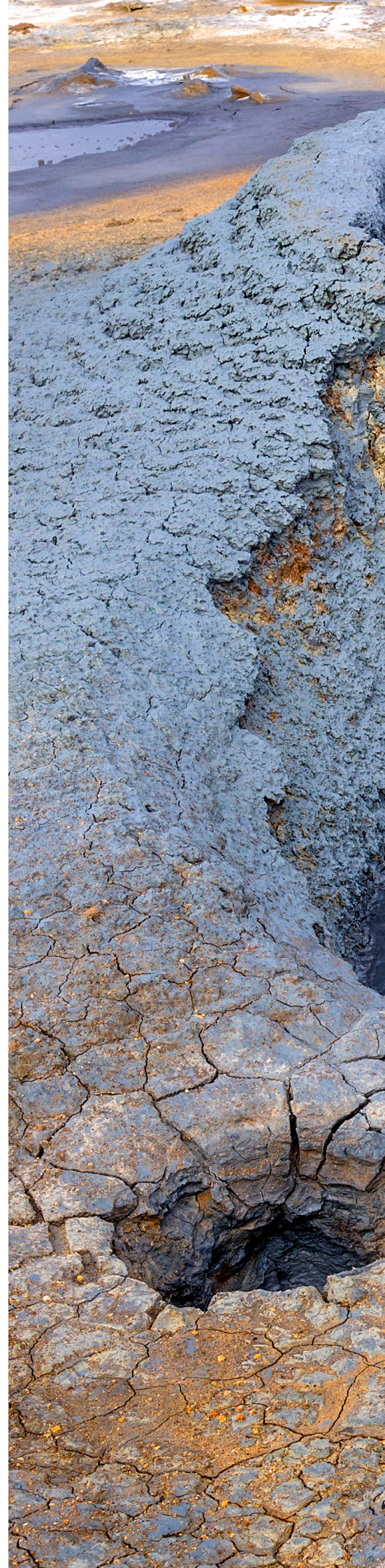
Solving the challenges to successful geothermal energy production

Introduction

Increasing populations and growing economies are quickly taking their toll on the earth and its natural resources so pressure is mounting to develop more sustainable renewable energy sources.

Why geothermal?

Being in isolation has showcased the impact on the natural environment we have created. Now, if not before, there is an increasing need and pressure to move towards more renewable focused energies – and this cannot be derived from wind and solar power alone. Geothermal has the potential to produce a large percentage of energy supplied. A base load energy of both electricity production and direct use it removes the technical challenges of intermittent energy supply and uncertainty around new technology upkeep of other renewables.





Considerations for developing Geothermal energy as a renewable energy source

DATA, DATA, DATA

Geoscientific data underpins the most critical decisions in the geothermal industry, but the data that backs these decisions can be poorly managed, adding risk and leading to significant inefficiencies, which ultimately affect the energy targets. Governments want to ensure that rigorous process and efficiency gains will be in place to manage all the disparate and ad-hoc data.

It is important to implement best practices to store and handle the data and extract value from it through interpretation and modelling.

There is also the risk that technology leads rather than enables the practitioner. This is exactly where we come in says Jeremy O'Brien, Global Director of Energy for Seequent, "As an industry, we need to help the expert teams to find smarter ways of accessing the right data, at the right time and make sure modelers continue to trust their own interpretation and decision-making skills."

GEOGRAPHICALLY CHALLENGED ADVISOR GROUP

Geothermal system can pose different challenges so collaborating across teams needs to be as simple as possible with timely transferral of information so important decisions can be made faster.

ASSIGNING BUDGET

A separate issue is how planning and budgets are applied to such key aspects as data management. O'Brien continues, "One of the fundamental flaws that geoscience faces is that we don't incorporate data management into our data collection plans. We will go out and design an exploration programme and put a budget towards that, but not enough thought is given to how the data will be managed once it is collected. Companies don't assign budget or resources specifically to manage the data. Even with the companies who are seen to be doing a good job, if there is no budget or resource attached, then we can't expect to have a quality data management programme in place."

VALUATIONS OF GEOTHERMAL COMPANIES SHOULD BE BASED ON INSIGHT FROM TRUSTED DATA

Extracting the quality and value from the raw data and building up a set of trusted interpretations and insights is what counts when it comes to making investment decisions. Conversely, this is not currently the basis on which companies are valued. Clare Baxter, Technical Sales Representative – Energy for Seequent outlines the example; "The success of a geothermal operation is built on a mixture of complex factors including: the resource that they own, sustainable management of that, and the level of confidence in the management team. Raw data does not feature in this list; however, the models built off the raw data that allow successful well campaigns to be developed and delivered do."

COMPLEX STAKEHOLDERS

The geothermal ecosystem spans wider than the subsurface technical specialties. A successful geothermal operation typically requires the support and engagement from financiers, community, power plant and infrastructure design, permits and cascading business and micro economy. Engaging with each to understand the positive impact geothermal development will achieve is crucial.

Many successful geothermally developed countries started with support and exploration conducted by government agencies. Marketing of the resources was vital to encourage the engagement of commercial development. Model management with one easy to find auditable truth aids in the administration of due diligence throughout the lifecycle of operation development.

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Jeremy O'Brien, Global Director of Energy for Seequent



Seequent's approach to supporting Governments

Seequent has focused on solving geothermal industry challenges since 2012, with the introduction of the first 3D implicit modelling solution, Leapfrog.

Recognising all the potential challenges, then it is important that processes are as easy as possible. "In every solution we create," says Jeremy O'Brien, "we focus on making data accessible and aid the visualisation process to make the understanding of data easier."

SUPPORTING COMMUNICATION

Seequent Central, is an example of this advanced and flexible visualisation. Central's 3D visualisation and data storytelling tools help geoscientists make conceptual models much more accessible to wider audiences – such as groups or stakeholders without geoscientific knowledge or technical expertise. These stakeholders are making decisions about investments and production and need to rapidly understand what they are basing their decisions on. Having a strong audit trail and being able to communicate what changes have been made and why, will also support the collaborative communication process. It is also good to remember that the study of the subsurface is a 3D science and it makes sense to collaborate in a 3D environment.

OPENNESS AND INTEROPERABILITY

Openness and interoperability have been identified by top geothermal countries as driving forces for successful geothermal development. Seequent supports these nations in technology tools to assist in facilitating their success. This is supported with a platform of data and model management located locally and of course, any data management solution needs to facilitate interoperability and provision of flexible tools for data import/export.

Clare Baxter comments. "We want managers to have the most holistic view of their data as possible. We are working to consume even more generational data sets and working with other industry leaders on new technologies and advances."

What will the future bring?

Technology is constantly and rapidly evolving and Seequent strives to remain at the forefront to ensure interoperability is achieved to the best advantage of the end user, not individual software companies. The data management challenge will continue to grow as the availability and collection of data becomes even more prolific. As an example, LIDAR data – point data generated from laser scans of surfaces provides data in the form of tens of millions of points. Companies need to ensure they have flexible and robust solutions in place to manage these complex and varied data sets.

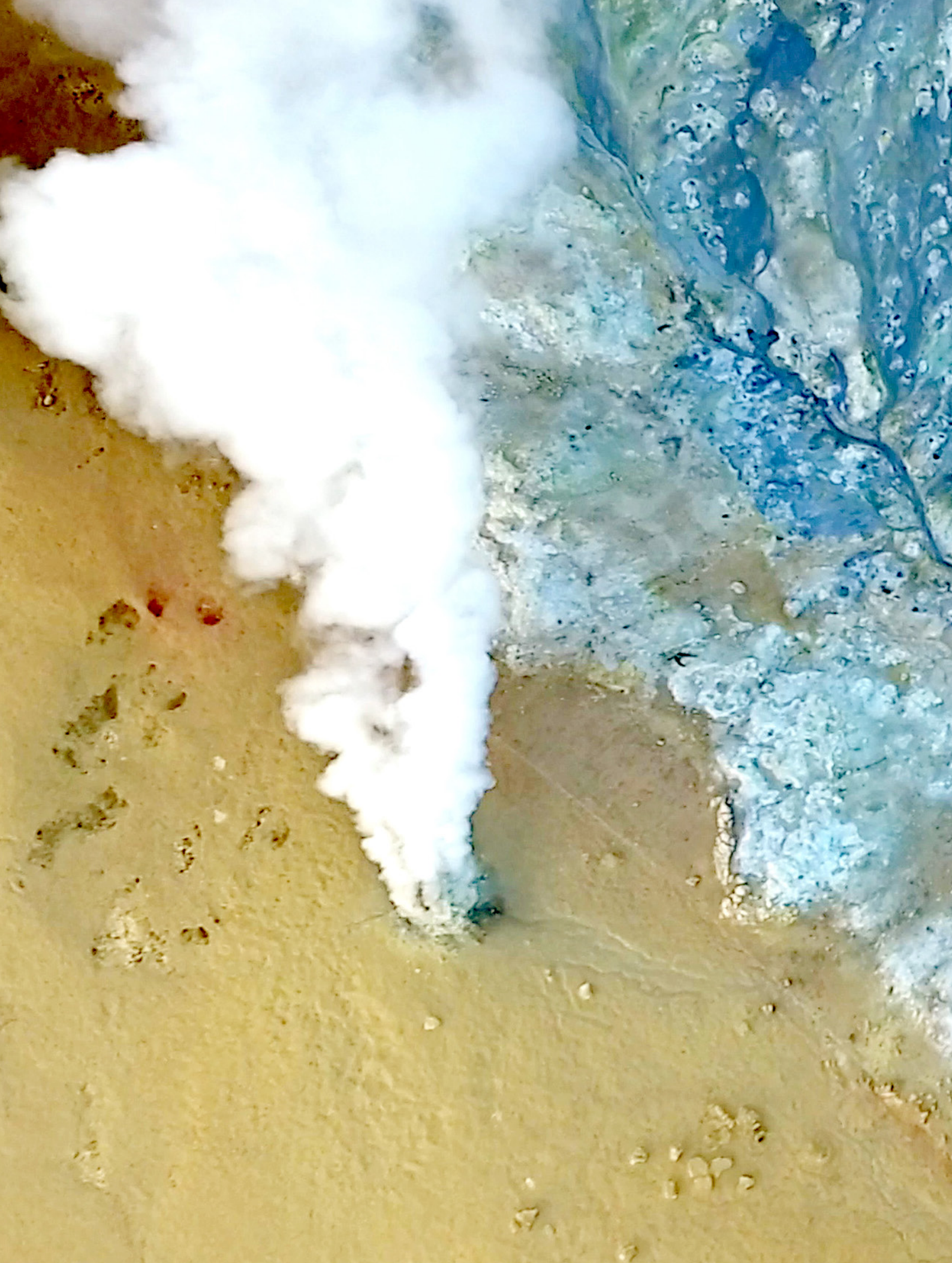
"Be prepared for an ongoing avalanche in the amount of data and how we get value from it. Everyone needs to take responsibility and ownership of this problem," Jeremy O'Brien remarks.

The entire data and modelling processes will become increasingly automated and Seequent's solutions will continue to evolve. Brennan Williams, Product Director for Energy at Seequent comments, "Algorithms have been around for years, but what has changed is the computing power or distributed computer power. Calculations are running in the Cloud and thousands of CPU are doing highly intensive computations on large data sets."

Secondly, there's the issue of data bias. The need for the expert who understands the data chain and decision making processes from early data acquisition through to interpretation remains integral.

Seequent will continue to strive to make geoscientific data accessible and intuitive with the belief that if the right resource is put into managing subsurface data, then better decisions will ultimately be made.

This 'right resource' means properly resourcing the management of geoscientific data both in terms of dollars and people with the right skills. This is where an industry data management platform, such as Central, which allows all geological data to be held in a single system, provides the ideal solution.



We look forward to discussing with you how Seequent will be able to support your journey through our technology. For any questions, please contact:

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COMPLEXITY TO CLARITY

Seequent is a global leader in the development of visual data science software and collaborative technologies.

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